Incorporating cooperative learning activities in *GEOL 0840: Introduction to Environmental Science* lecture and recitation

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GEOL 0840: Introduction to Environmental Science

• ~150 Students
• Intro course for Environmental Science (BS) and Environmental Studies (BA) majors
• Natural Science General Education Requirement
Course Content Goals

• Explain how the scientific method is used to investigate environmental issues

• Describe core concepts from biology, chemistry, and geology related to environmental issues

• Communicate the environmental consequences of increasing human populations (example: air, water and soil pollution)
GOALS for Course Transformation

• To improve student understanding and retention of course content
• To increase student engagement in lecture and recitation
• To better integrate recitation and lecture material
GOALS for Course Transformation

• Convert one lecture per week to an active learning activity
• Create pre-recitation videos to prepare students for recitation activities
Class Format

• 3 credits
• Lecture 2x week (3:00pm-3:50pm T, Th)
  • Lecture 1x week
  • POGIL 1x week
• Recitation 1x week (50 min on W or F)
  • Pre-Recitation Videos
  • Quiz
  • Active-learning activity
Pre-Recitation Videos

- Content not covered in lecture
- Standardize information across sections
- EXISTING: 5-10 min lecture, animation, demonstration OR NEW: 5-10 min mini-lecture
- Required and content on recitation quiz
Benefits of Cooperative Learning

Increased measures of:
- Problem solving
- Knowledge acquisition and retention
- Higher-level reasoning
- Transfer of knowledge and skills
- Interest in material
- Exam scores
- Motivation
- Self-esteem
- Positive attitudes toward learning
- Better interpersonal relationships

Decreased D/F/W rates

POGIL  
(process oriented guided inquiry learning)

• Problems in a real-world context
• Closer to process of scientific inquiry
• Instructor assigned “learning teams”
  • Mixed student groups
  • 3-4 students per group
• Content will be on quizzes/exams
Assessment of Student Learning Outcomes

• Clicker Questions in Lecture/Discussion
• POGIL Activities
• Recitation Activities
• Weekly Recitation Quizzes
• 2 Mid-Term Exams
• 1 Final Exam
Assessment of Transformation Goals

Goal 1: To improve student understanding and retention of course content

• Compare grades between Fall 2016 and Fall 2017
  • Grades on repeated recitations and recitation quizzes
  • Exam grades (question by question possible)
  • Final course grades
  • D/F/W rates

• Compare topics taught in lecture both semesters to those taught in POGIL format in 2017